



Personal Computer XT

Guide to Operations

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*Personal Computer
Hardware Reference
Library*

Guide to Operations

First Edition (September 1985)

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Warning: The equipment described herein has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with noncertified peripherals is likely to result in interference to radio and TV reception. If peripherals not offered by IBM are used with the equipment, it is suggested to use shielded grounded cables with in-line filters if necessary.

INSTRUCTIONS TO USER

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the operating instructions, reference manuals, and the service manual, may cause interference to radio or TV reception. It has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a residential installation.

If this equipment does cause interference to radio or TV reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the equipment with respect to the receiver.
- Move the equipment away from the receiver.
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.
- Ensure that card mounting screws, attachment connector screws, and ground wires are tightly secured.
- Ensure that card slot covers are in place when no card is installed.
- If peripherals not offered by IBM are used with this equipment, it is suggested to use shielded, grounded cables, with in-line filters if necessary.

If necessary, consult your dealer service representative for additional suggestions.

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

CAUTION

This product is equipped with a line cord and plug for the user's safety. It is to be used in conjunction with a properly grounded receptacle to avoid electrical shock.

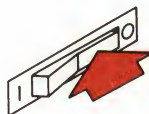
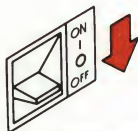
Electrical Safety

Electrical current from power, telephone, and communications cables is hazardous. Connect and disconnect cables as shown when installing, moving, or opening the covers of personal computers or attached devices.

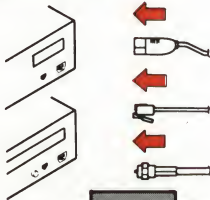
To Connect

To Disconnect

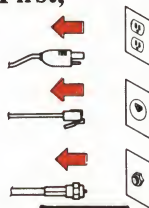
Turn Everything OFF.



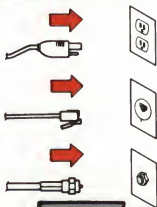
Devices First,



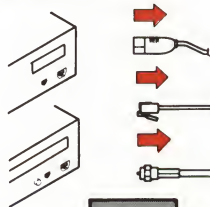
Outlets First,



Then Outlets.



Then Devices.



OK

OK



Notes:

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SECTION 1. INTRODUCTION

The IBM Personal Computer XT is a system with a keyboard, and at least one diskette drive. The system unit is the central part of your computer and supports a variety of options. The keyboard, which is used to send data to your system, is attached by a coiled cable. The diskette drive installed in your system unit can read data from a diskette and record data on a diskette.

To tailor a system to your particular needs, you can choose internal and external options that perform the functions you need. An example of an internal option is the Color/Graphics Monitor Adapter, which allows a Color Display, an external option, to be attached to your system. You can add a display, a printer, additional memory, or other options to expand your system.

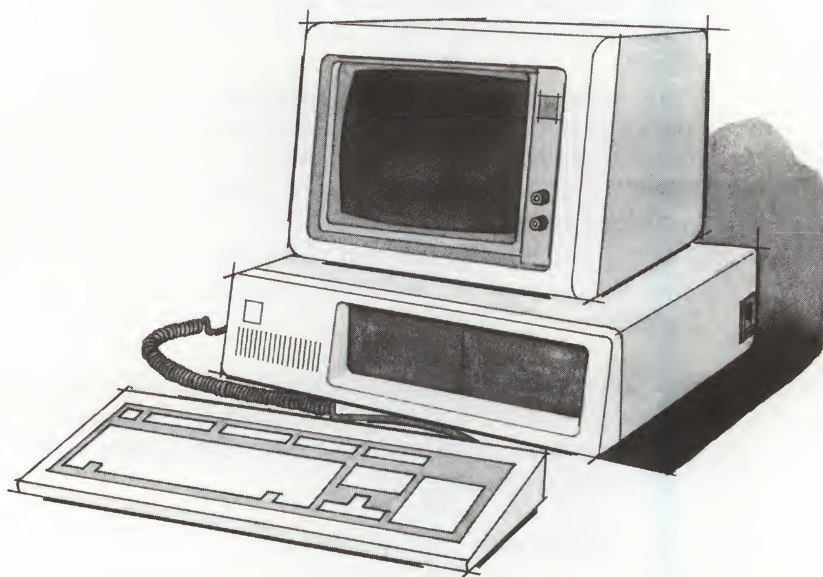
Hardware alone does not form a completely functioning IBM Personal Computer XT system. Three elements must be present in order to have a functioning IBM Personal Computer XT:

- Hardware
- Software
- You.

Hardware

Minimum hardware requirements are:

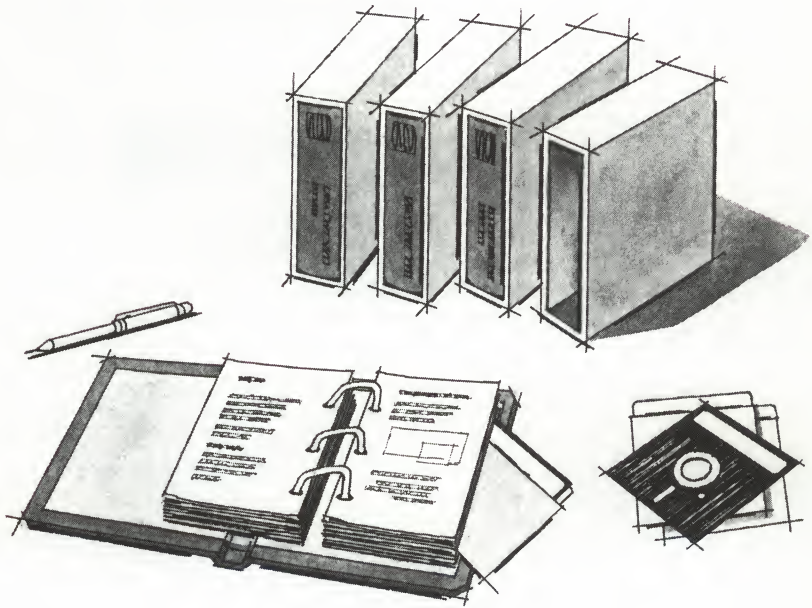
- System unit with one diskette drive
- Keyboard
- Display.



Software

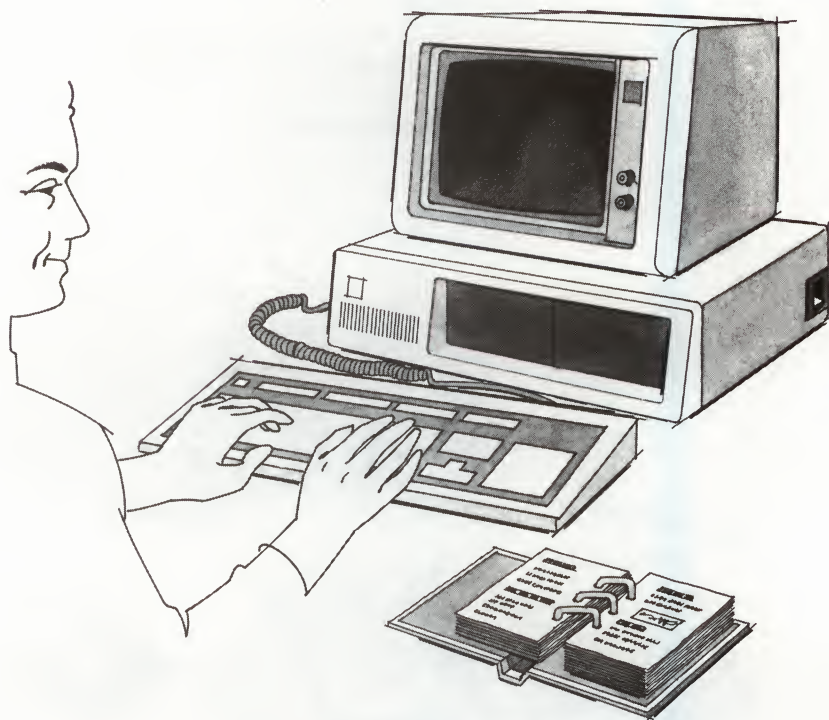
Software can be any of the following:

- Disk operating system
- Game program
- Financial program
- Programming language such as BASIC
- Other programs of your choice.



You

You are the most important element of a properly working IBM Personal Computer XT. You bring the elements of hardware and software together. This manual, *Guide to Operations*, will help you become familiar with the hardware.



The *Guide to Operations* can be used as a reference manual. You will probably use only a portion of the information it contains each time you open the book. By answering the questions in the next section, "Getting Started," you will be led through the book.

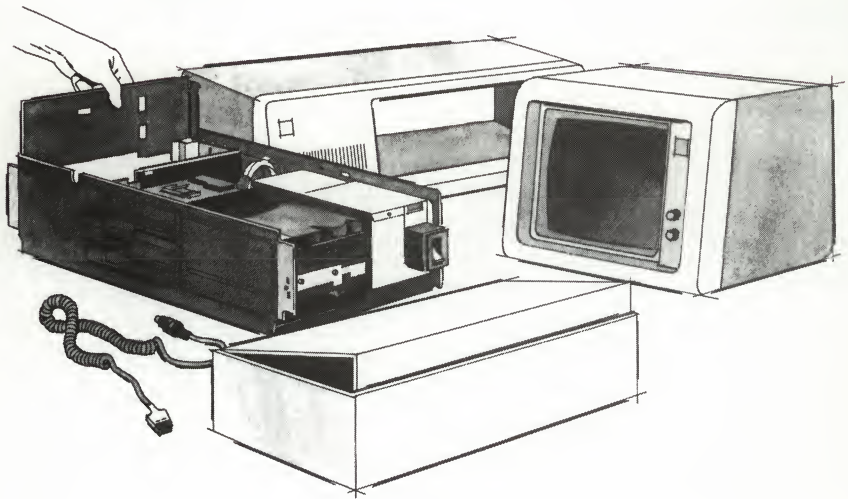
Continue with the next section.

SECTION 2. GETTING STARTED

You are ready to get started. The following steps will help you determine which sections in the *Guide to Operations* to use.

1 Have all your *internal* options been installed in your system unit?

Note: Internal options are parts installed *inside* the system unit, such as the adapter your display is attached to.

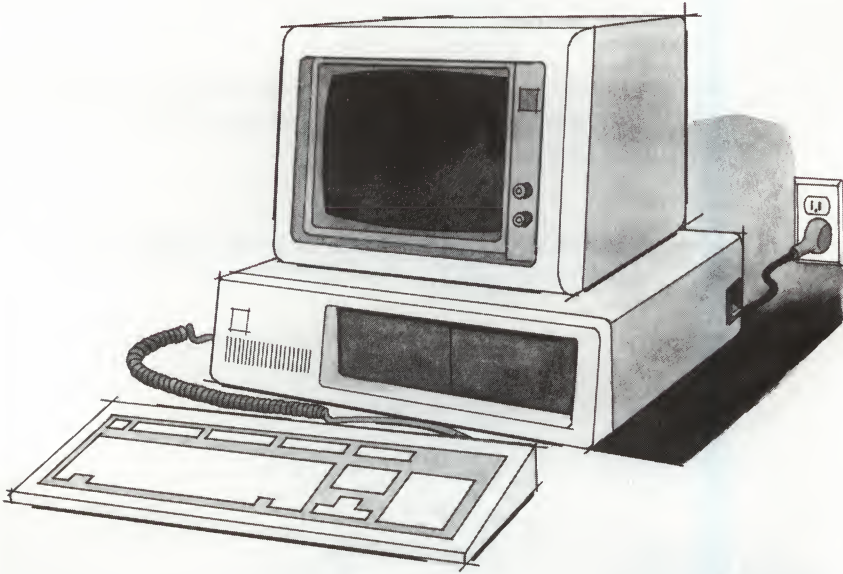


YES Continue with the next step.

NO Go to "Internal Options," page 4-3.

2

Is your IBM Personal Computer XT cabled and ready to use?



YES Go to "Exploring The IBM Personal Computer XT," page 3-3.

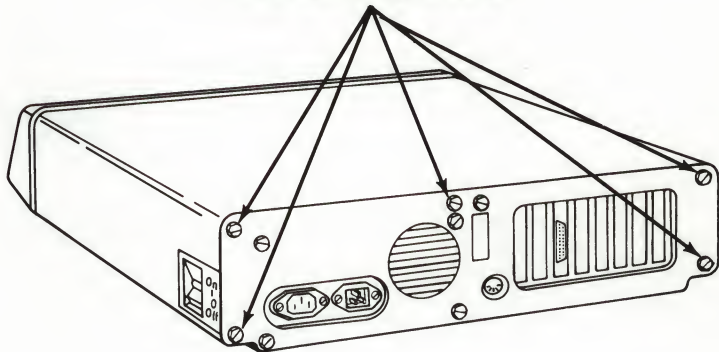
NO Continue with "System Checklist," page 2-3.

System Checklist

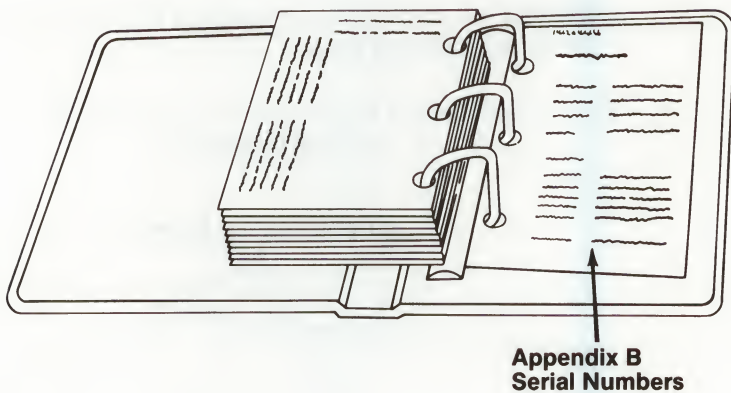
IMPORTANT: Before you connect the power cord to your system unit be sure:

- ☐ The system unit cover is on and the cover mounting screws are installed.

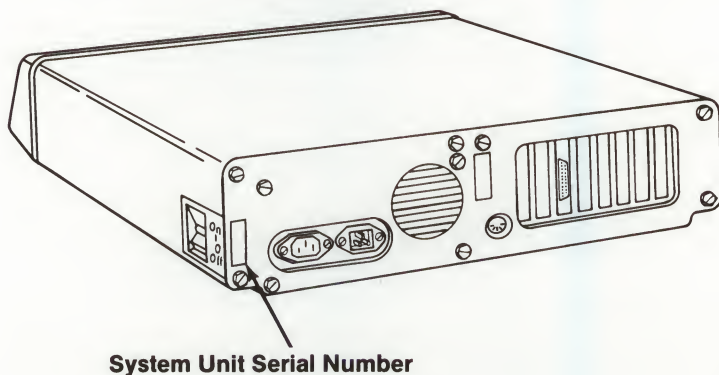
Cover Mounting Screws



- Equipment serial numbers are recorded in the space provided in "Appendix B."

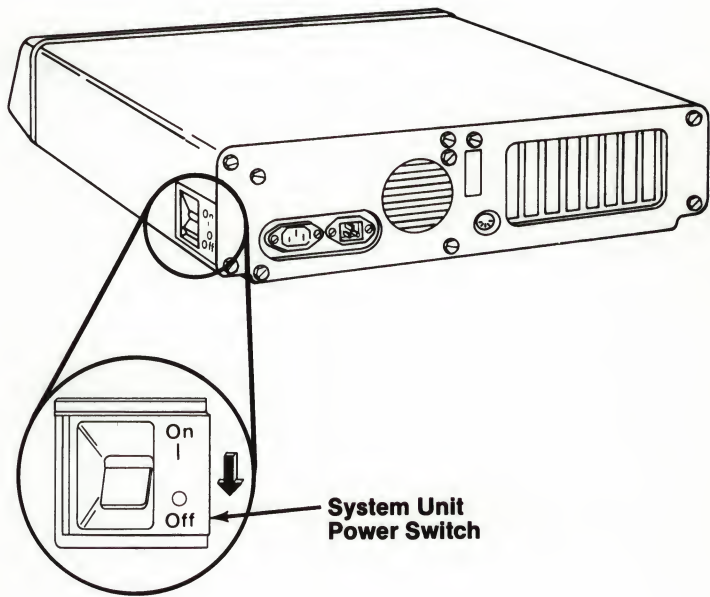


The location of the system unit serial number is shown below.



Cabling

- 1 Turn off the system unit.

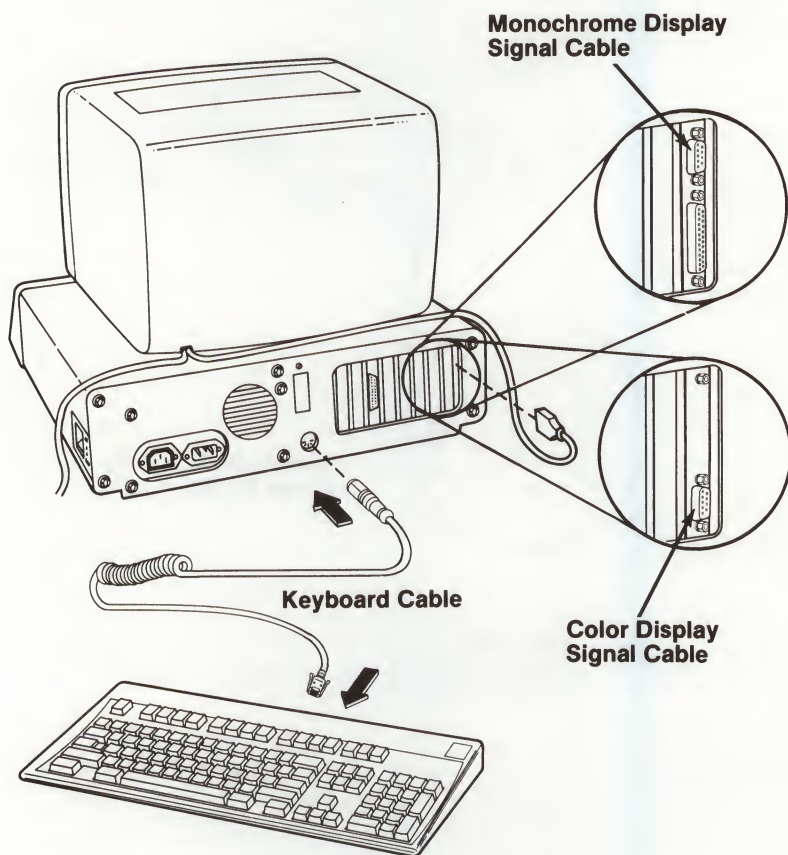


- 2 Turn off the power to all external options (printer, display and others).

3

Connect display and keyboard cables to the system unit and keyboard as shown below.

Warning: Damage to your IBM Monochrome Display may result if it is connected to an IBM Color/Graphics Monitor Adapter.



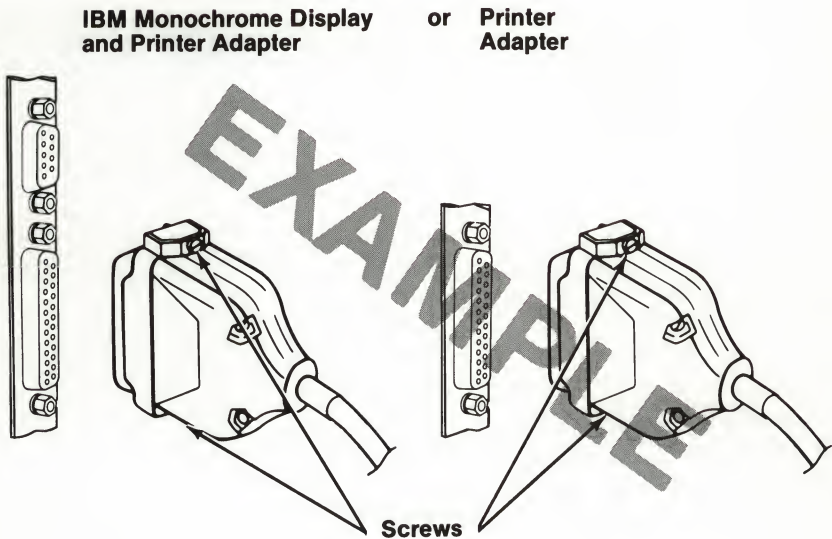
4 Are you installing a printer at this time?

YES Continue with the next step.

NO Go to Step 9 on page 2-9.

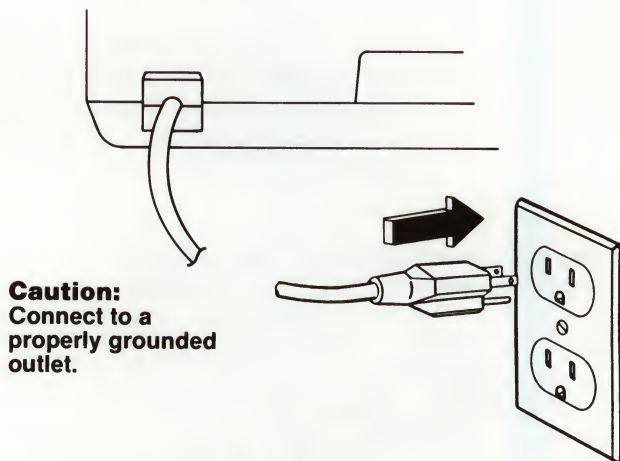
5 Connect the printer cable to the appropriate adapter on your system unit.

Note: Connect your printer to the IBM Monochrome Display and Printer Adapter, if you have one. Otherwise, connect your printer to any printer adapter.



6 Tighten the screws.

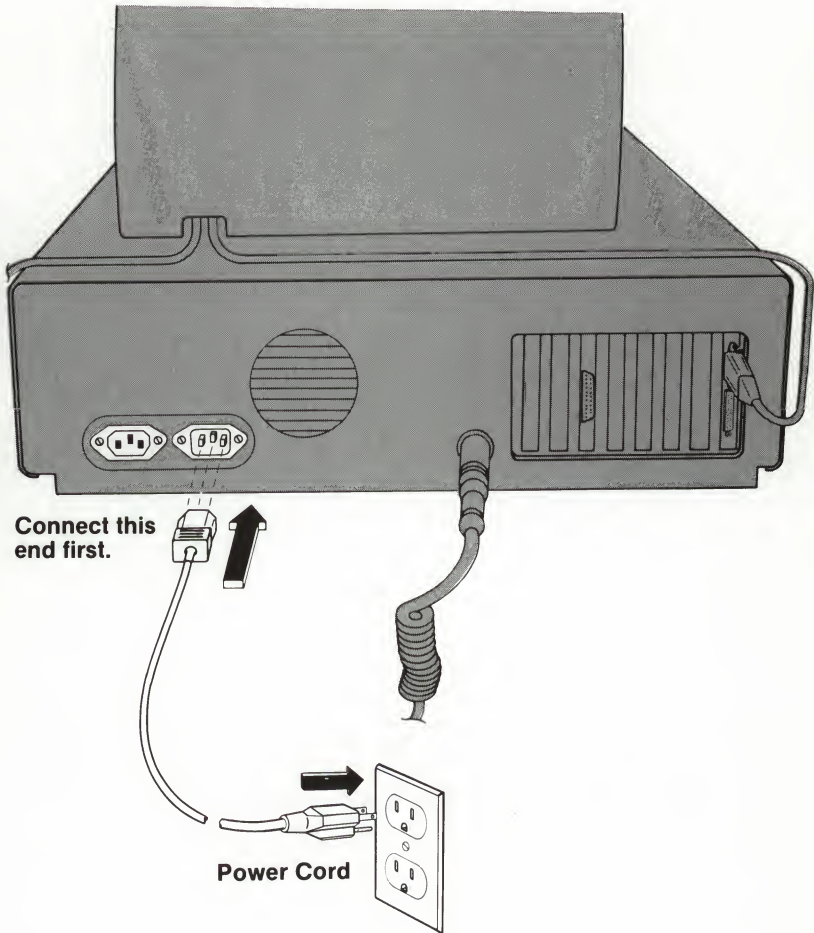
- 7 If your printer is not already set up, refer to the instructions that come with it to complete its installation.
- 8 Connect the printer power cord to the printer, then plug it into the electrical outlet.



CAUTION

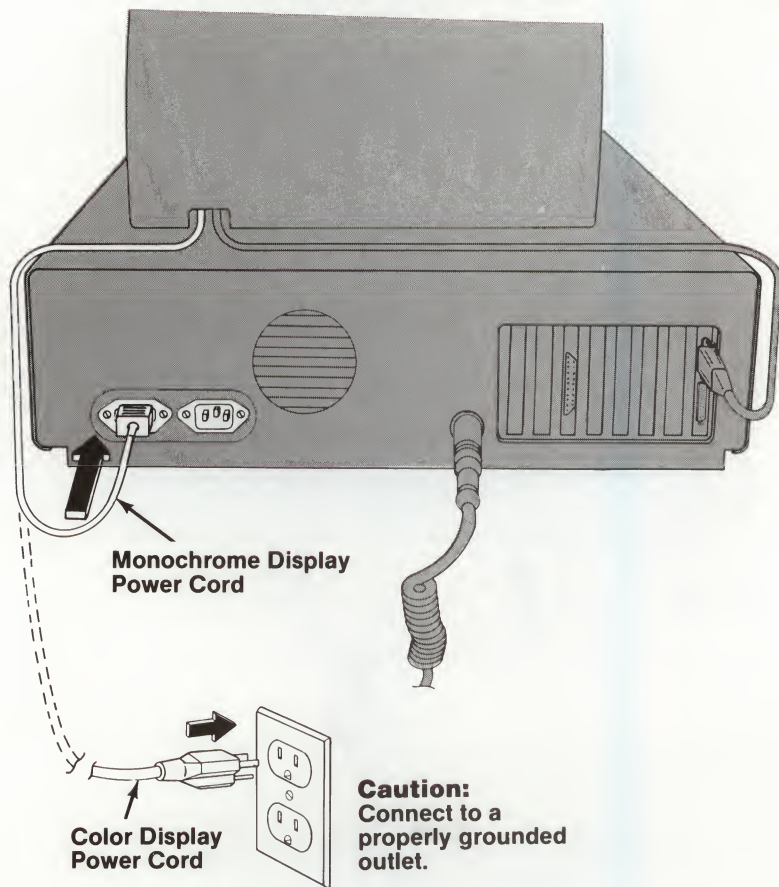
This product is equipped with a line cord and plug designed for the user's safety. It is to be used with a properly grounded receptacle to avoid possible electrical shock.

- 9 Connect the power cord to the system unit, then plug it into the electrical outlet.



- 10 Connect the power cords for other external options as shown.

Note: If your external option has a detachable power cord, connect it to the external option first and then plug it into the electrical outlet.



- 11 Continue with the next section.

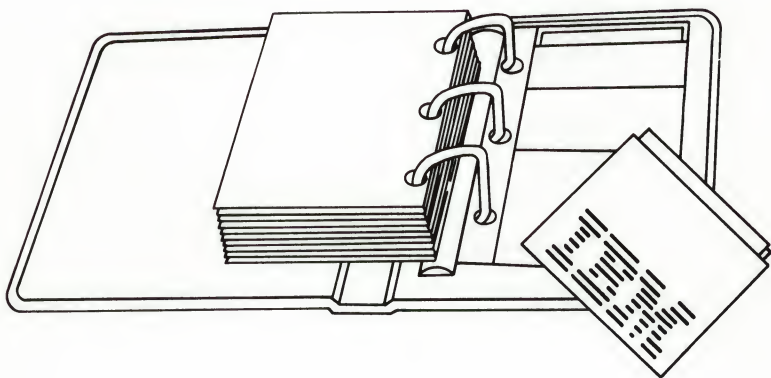
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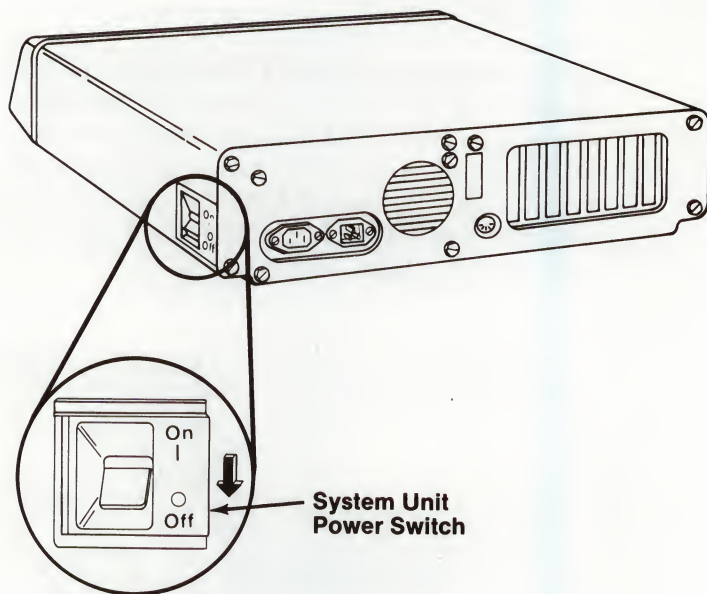
Notes:

Exploring The IBM Personal Computer XT

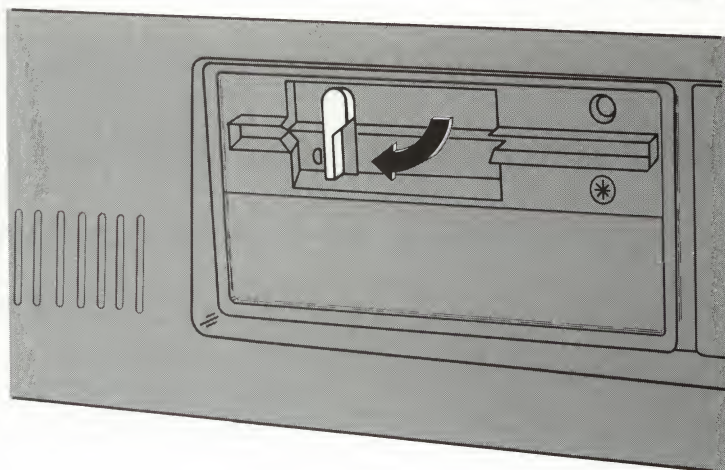
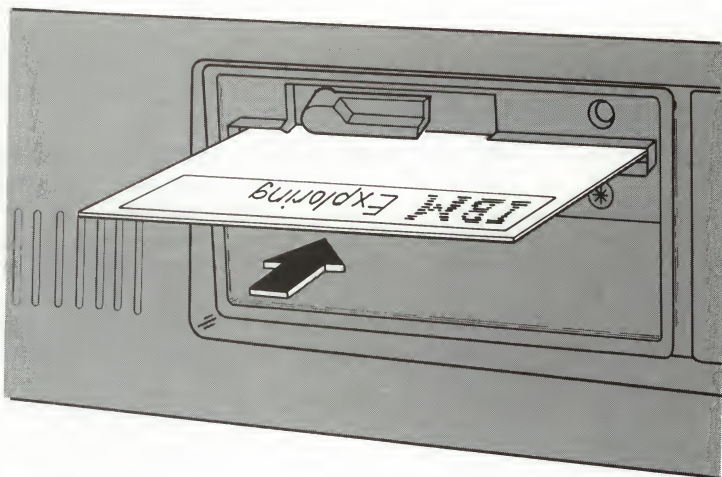
Included with your *Guide to Operations* manual is a diskette called "Exploring The IBM Personal Computer XT." The program on this diskette is designed to help you understand and use your system. Get the "Exploring The IBM Personal Computer XT" diskette from the back of this manual, and continue with the next page.



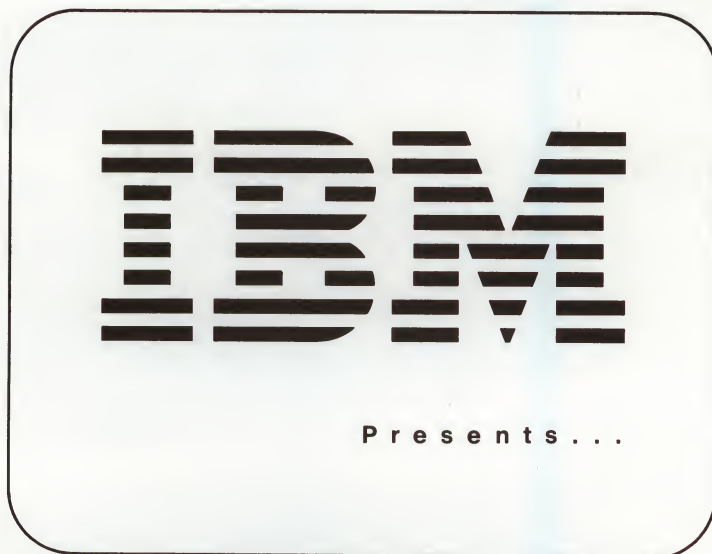
- 1 Turn off the system unit.



- 2 Insert your "Exploring" diskette into drive A.



- 3 Turn your display controls clockwise.
- 4 Turn on all external options (printer, display and others).
- 5 Turn on the system unit.
- 6 Adjust your display controls for eye comfort.



YES Follow the instructions on the screen.

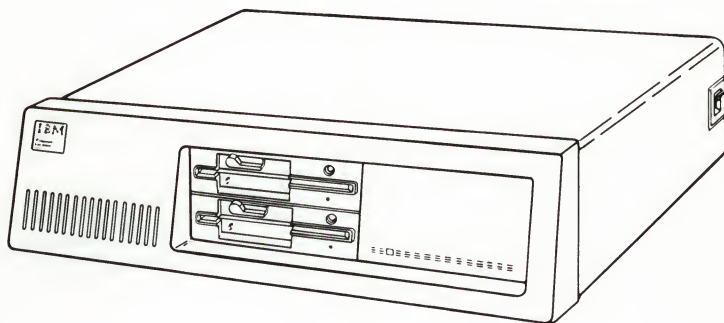
NO Remove the diskette and verify that:

- It is the "Exploring" diskette.
- It was loaded properly. To verify that the diskette was loaded properly, begin with Step 1 on page 3-4.

If the diskette was loaded correctly, and you do not get the screen shown above, go to "Testing Your System."

System Unit

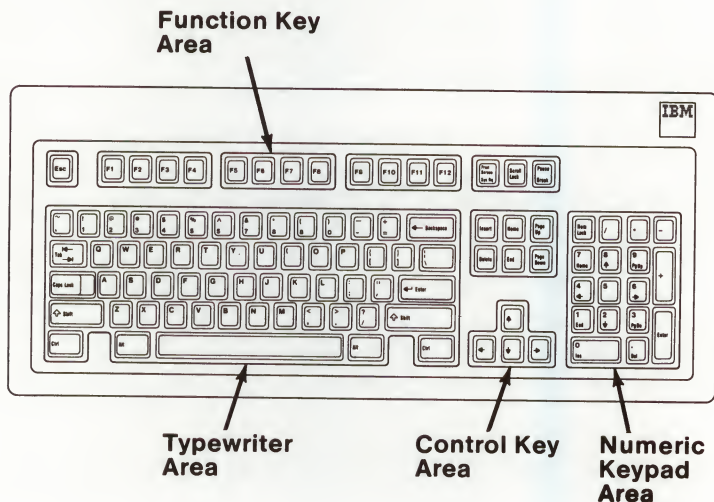
The main part of your IBM Personal Computer XT is the system unit. It processes data and controls the operations of your system through a set of instructions called *software* or a *program*. The IBM Personal Computer XT comes with an installed program language called IBM BASIC. A wide variety of programs are available from your dealer.



Keyboard

The keyboard is divided into four sections: the typewriter area, the function keys, the numeric keypad, and the control key area.

Note: The 101-key keyboard is used in these examples. The keypad characters for the 102-key keyboard are shown in the “Keyboard Templates” section of this manual.



Typewriter Area

Most of the keys are typematic; that is, they repeat as long as you hold them down. The keys in the typewriter area are similar to those of a standard typewriter with the following exceptions.

There are two home row identifiers. These identifiers are horizontal ridges located on the F and J keys that allow you to locate the home row without looking at the keyboard.



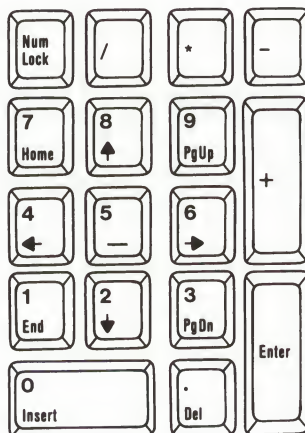
Function Key Area

Twelve function keys, above the typewriter area, are under program control. Their operation is defined in your operating-system or application-program manual.



Numeric Keypad Area

Pressing the Numeric Lock (Num Lock) key one time switches the cursor keys to number keys, and the shift keys work in reverse. While in the **Num Lock** mode, the shift key must be held down to use the numeric keypad as cursor control keys. The keypad is arranged like a calculator to save time when typing many numbers. Pressing **Num Lock** again returns keys 0 through 9 to cursor control keys.

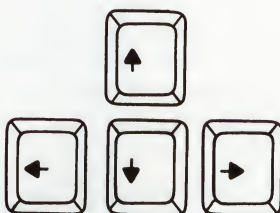
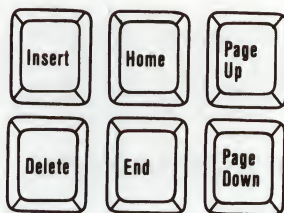


The numeric keypad has an identifier on the **5** key. This identifier is a horizontal ridge located on the key that allows you to locate the center of the numeric keypad without looking at the keyboard.



Control Key Area

The control keys are used for cursor and program control.

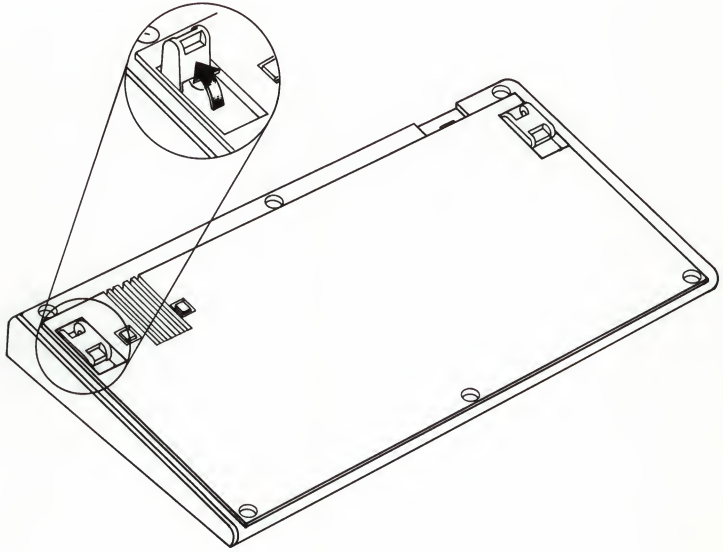


The cursor controls are separate from the numeric keypad and function the same as the cursor controls on the numeric keypad. These keys function as cursor controls only, and are not affected by the **Num Lock** key.

Keyboard Height Adjustment

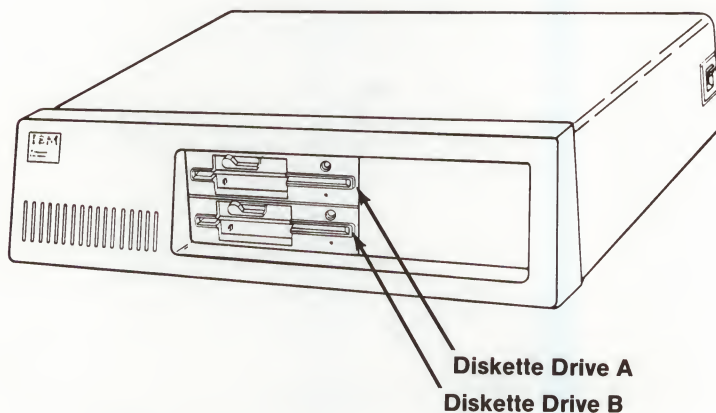
You can adjust your keyboard to two positions for typing comfort.

To adjust, turn your keyboard over and set both keyboard legs to the desired position.



Diskette Drives

Diskette drives are used to read data from, and record data on diskettes. Two diskette drives can be installed in your system.



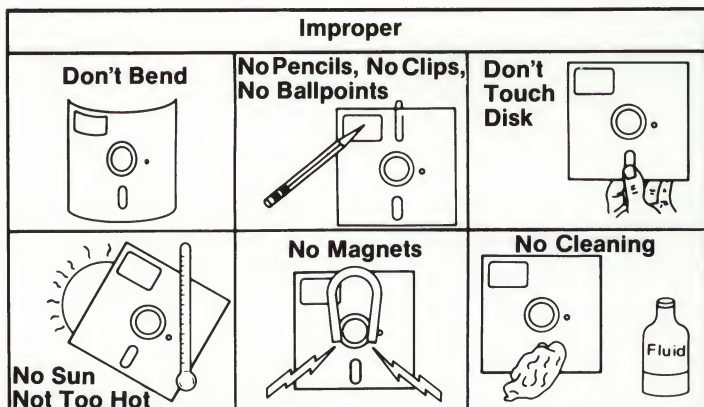
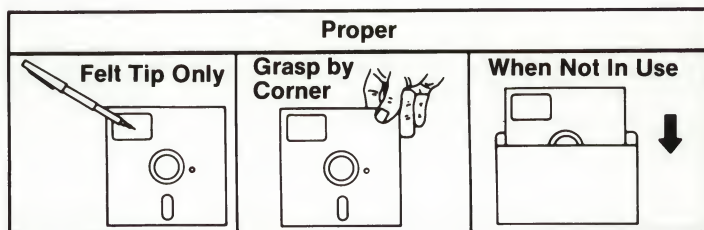
About Diskettes

A diskette is a 5-1/4 inch magnetic disk inside a protective plastic jacket. Diskettes are used to store data.

Your selection of the correct diskette is *important* to the successful operation of your IBM Personal Computer XT.

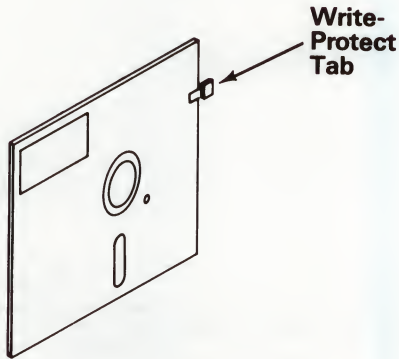
Diskette Care

The figures below show proper and improper ways of handling your diskettes. Proper handling will greatly reduce the possibility of damaging them.



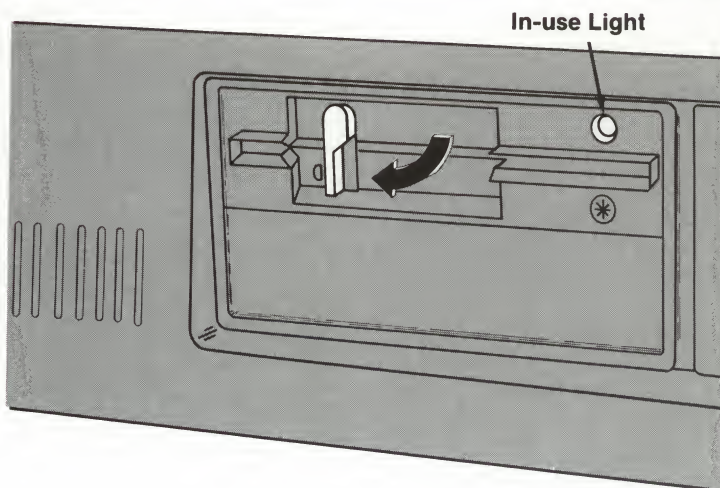
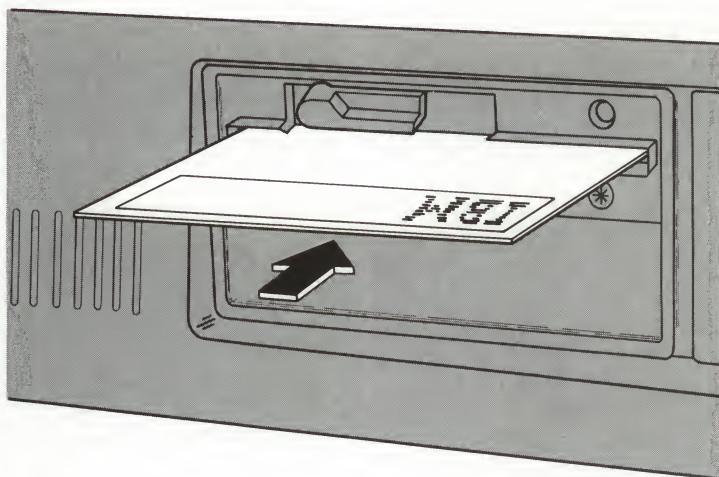
Write Protect

When a diskette is write protected, no information can be recorded (written) on the diskette. To make a diskette write protected, cover the notch on the side of the diskette with a write-protect tab. If you want to record (write) information on a diskette, remove the write-protect tab.



Loading Your Diskette Drive

- 1 When you have fully inserted the diskette, it clicks into place. When the in-use light is on, it indicates the system unit is using the diskette drive.

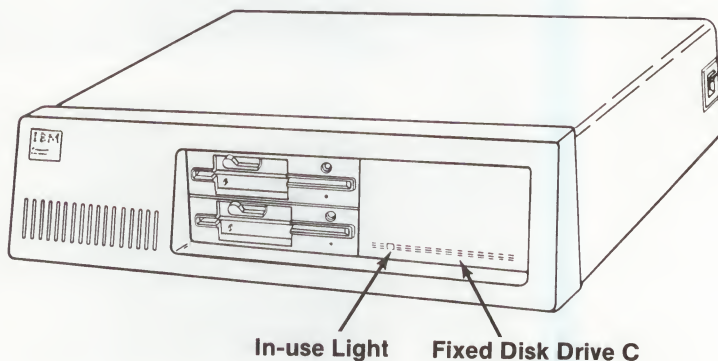


- 2 To remove a diskette from the diskette drive, rotate the diskette drive lever counterclockwise and pull your diskette out. Do not remove your diskette when the in-use light is on.

Fixed Disk Drives

Your fixed disk drive requires an operating system, such as the *IBM Disk Operating System (DOS)*, to store and retrieve data.

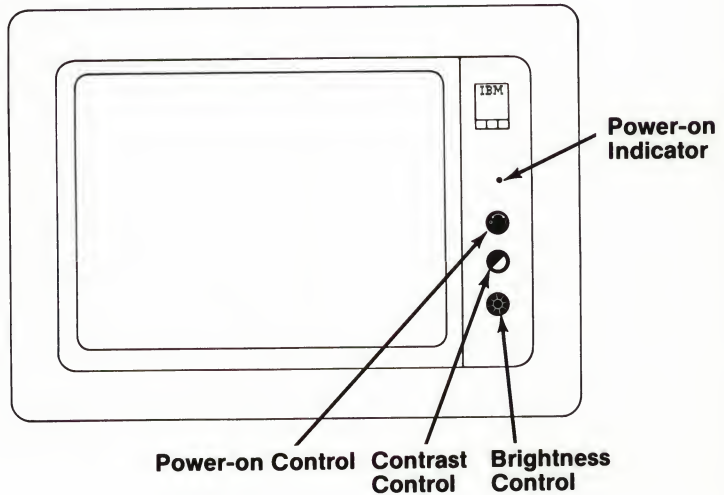
One fixed disk drive (as well as one or two diskette drives) can be installed in your system.



Displays

All IBM color displays have a Power control. The Power control turns your display on and off. The Power-on indicator lights when your display is turned on.

The IBM Monochrome display plugs into the rear of the system unit. It is turned on or off when the system unit is turned on or off.



Moving Your System

Do you have a fixed disk drive?

YES To prevent a loss of data stored on a fixed disk drive, back up all the files before moving your system. (See your disk operating system manual for backup instructions.)

When you have completed backing up your files, continue with Step 1.

NO Go to Step 7 on page 3-20.

1 Load the Diagnostics diskette (found at the back of this manual) into drive A.

2 Turn on the system unit.

- 3 The following appears on your screen.

**The IBM Personal Computer DIAGNOSTICS
Version XXX (C) Copyright IBM Corp XXXX, XXXX**

SELECT AN OPTION

- 0 - SYSTEM CHECKOUT**
- 1 - FORMAT DISKETTE**
- 2 - COPY DISKETTE**
- 3 - PREPARE SYSTEM FOR MOVING**
- 9 - END DIAGNOSTICS**

ENTER THE ACTION DESIRED

?

- 4 Press 3 and then press Enter (↵).

- 5 When the following message appears on your screen, your fixed disk drive is ready to be moved.

SELECT AN OPTION

- 0 - SYSTEM CHECKOUT**
- 1 - FORMAT DISKETTE**
- 2 - COPY DISKETTE**
- 3 - PREPARE SYSTEM FOR MOVING**
- 9 - END DIAGNOSTICS**

ENTER THE ACTION DESIRED

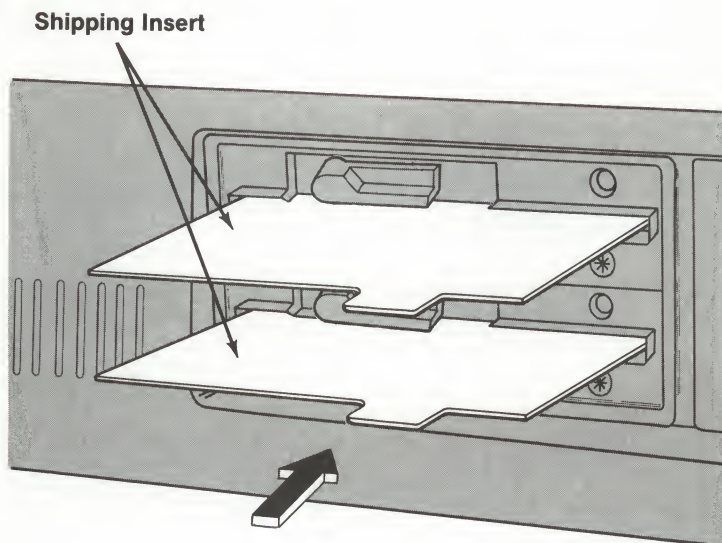
? 3

SYSTEM PREPARED FOR MOVING

- 6 Remove the Diagnostics diskette.
- 7 Turn off the system unit.
- 8 Turn off all external options.

- 9 Put a shipping insert into each diskette drive. Rotate the diskette drive lever clockwise.

Note: If you do not have a shipping insert, use a blank diskette.



- 10 Unplug your system unit power cord from the electrical outlet. Also, unplug any external options.
- 11 Disconnect and secure all cables and cords.

Long-Distance Move

If you saved the original shipping cartons and packing materials that your IBM Personal Computer XT came in, use them to pack your units.

If you are using different cartons, cushion your units well to avoid any damage.

Setup at Your New Location

When your system arrives at the new location, unpack it carefully.

To set up and cable your system, refer to "System Checklist," page 2-3.

SECTION 4. INSTALLING YOUR OPTIONS

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Notes:

Internal Options

Internal options are parts installed inside the system unit. Some of the internal options available for your system are listed below.

- Memory expansion options
- Display adapters
- Diskette drives
- Printer or communication adapters.

Options come with instructions for your IBM Personal Computer XT. File option instructions you wish to save in a section convenient for you.

Install memory options on your system board first. Only the Asynchronous Communications Adapter can be installed in expansion slot 8 of your IBM Personal Computer XT. Install other options in any order that is convenient for you.

Before you can install any internal options you must remove the cover using the procedure in this section.

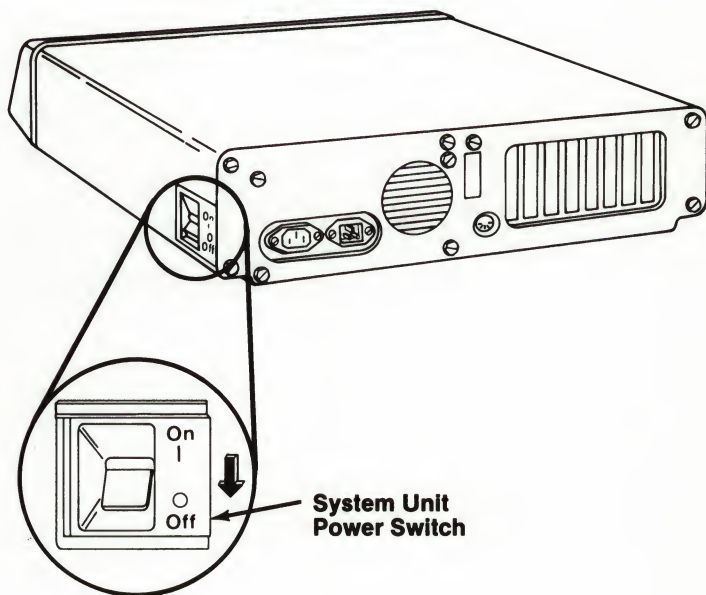
Required Tools

- Medium-size, flat-blade screwdriver
- Small-size, flat-blade screwdriver.

Notes:

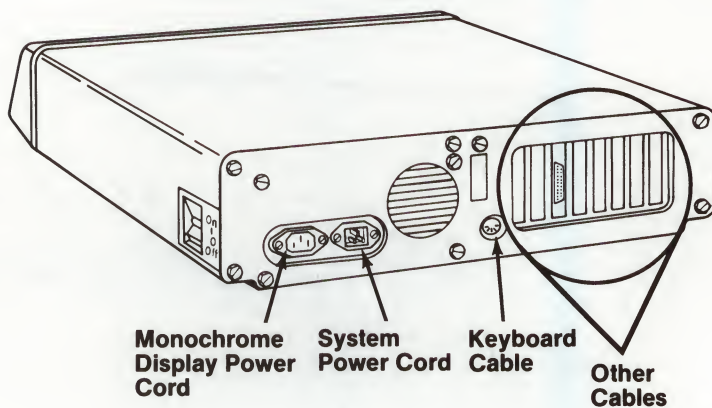
Cover Removal

- 1 Turn off your system unit.

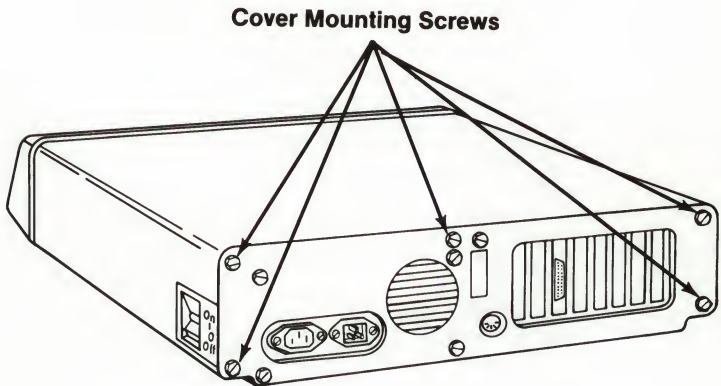


- 2 Turn off all external options (printer, display and others).
- 3 Unplug your system unit power cord from the electrical outlet.
- 4 Unplug any external options from the electrical outlet.

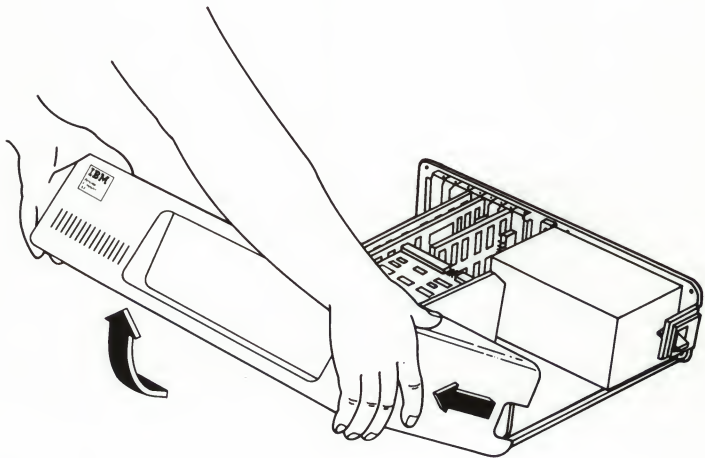
- 5 Note the locations of all cables or cords, and disconnect them from the back of your system unit.



- 6 Remove the cover mounting screws.

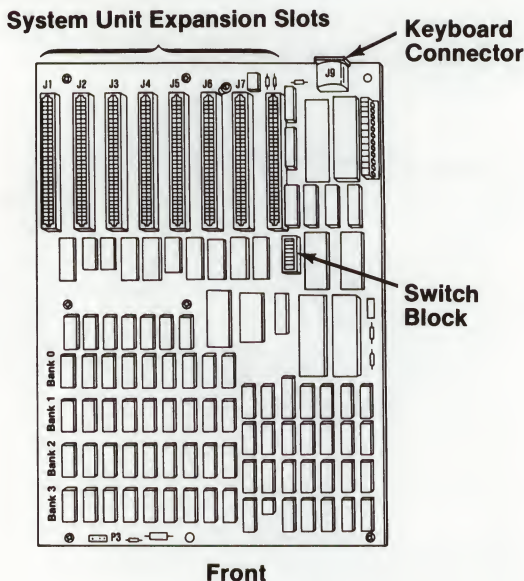


- 7 To remove the cover:
- a. Slide the cover to the front until it stops.
 - b. Tilt the cover up to remove it from the base.



- 8 Continue with the instructions packaged with the option you are installing.

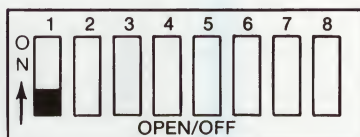
System Board Switches



The switches on the system board are set as shown in the figure below and on the following pages. These settings are necessary for the system to recognize the attached options and to specify the amount of memory on the system board. Set a rocker switch by pressing down the rocker to the desired position. Push a slider switch to the desired position.

Warning: Before you change any switch settings, make a note of how the switches are presently set.

Note: Some switch blocks are labeled ON and OFF; others are labeled ON and OPEN. OPEN is the off position.



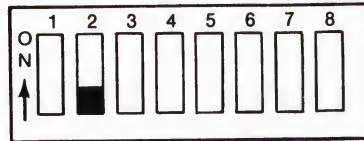
Switch Block

Switch	Function
1	Normal Operation; always Off
2	Coprocessor
3-4	Amount of memory on the system board
5-6	Type of display attached
7-8	Number of diskette drives installed

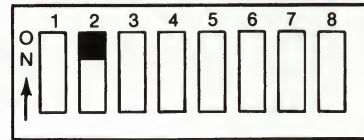
Coprocessor

Switch 2 is set to indicate if the coprocessor is installed.

With Coprocessor



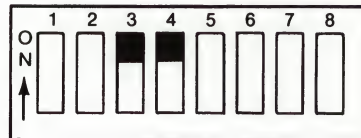
Without Coprocessor



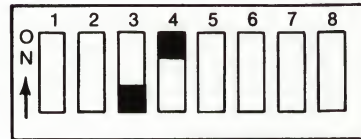
Memory

The following figure shows the settings for switches 3 and 4 for the amount of memory on the system board.

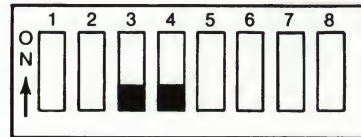
256K



512K



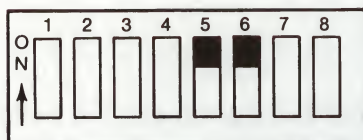
640K



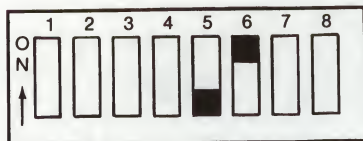
Displays

The following figures show how switches 5 and 6 must be set for the type of display adapter installed in your system. If your display is not listed below, check the instructions that come with the display adapter.

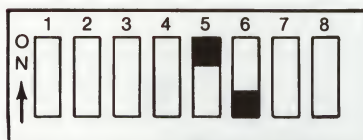
Warning: If an IBM Monochrome Display is attached to your system, it must be attached to either a Monochrome and Printer Adapter or an Enhanced Graphics Adapter. Switches 5 and 6 must be set correctly for the type of adapter installed. Failure to follow this warning may result in damage to your display.



IBM Enhanced Graphics Adapter (alone or with another adapter) or NO adapter at all.



IBM Color/Graphics Adapter in 40x25 Color mode.



IBM Color/Graphics Adapter in 80x25 Color mode.



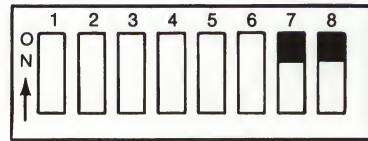
IBM Monochrome and Printer Adapter or the IBM Monochrome and Printer Adapter and the IBM Color/Graphics Adapter together.

Note: The 40x25 mode means the screen is 40 characters wide by 25 lines high. 80x25 is 80 characters wide by 25 lines high. The 80x25 mode, when used with home televisions and various displays, can cause loss of character quality.

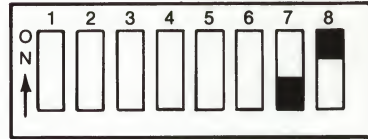
Diskette Drives

The following figures show how switches 7 and 8 must be set for the number of diskette drives installed.

1 Diskette Drive



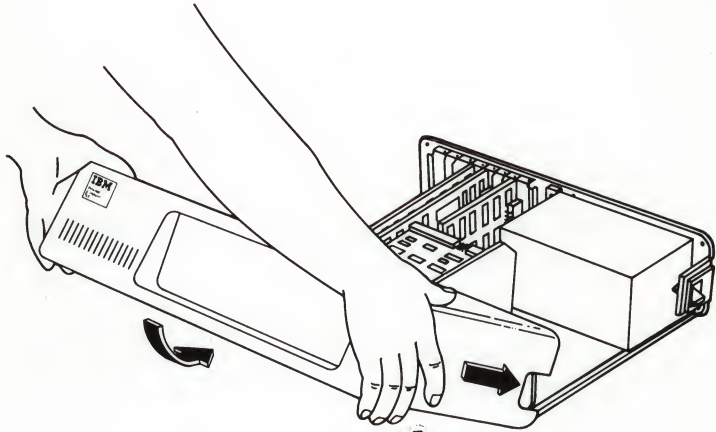
2 Diskette Drives



Notes:

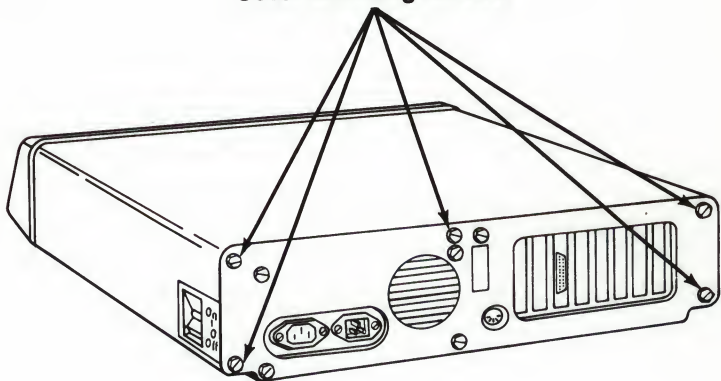
Cover Installation

- 1 Install the system unit cover.



- 2 Install the cover mounting screws.

Cover Mounting Screws



- 3 If you have options to install that attach to the outside of your system unit, continue with "External Options," page 4-14. If not, go to "System Checklist," page 2-3.

External Options

External options attach to the *outside* of your IBM Personal Computer XT. Some of the external options available for your system are:

- Displays
- Printer or communication devices
- Cables.

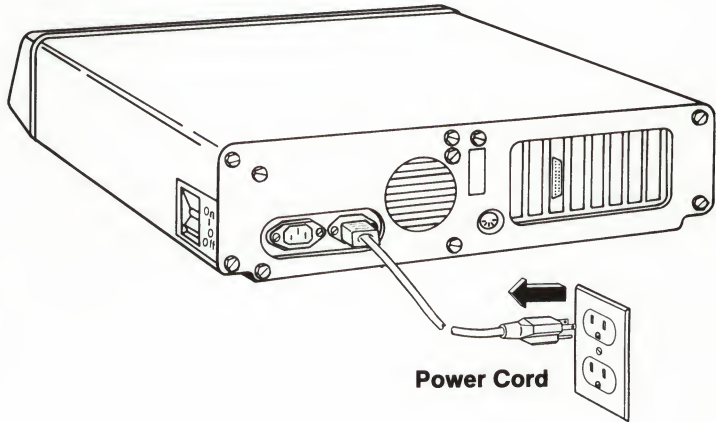
Use the installation and operating instructions that come with your option.

Note: When separate operating instructions come with your options, you may file them in this manual.

Required Tools

- Medium-size, flat-blade screwdriver
- Medium-size, Phillips screwdriver (printers only).

- 1 Turn off your system unit.
- 2 Turn off all external options (printer, display and others).
- 3 Unplug power cords (system, printer, display and others) from electrical outlets.



- 4 Continue with the instructions packaged with the option that you are installing.

Notes:

SECTION 5. TESTING YOUR SYSTEM

Problems with your system can be caused by software, hardware, or both. This section will help you determine the cause of a problem and what to do about it.

Note: Use this section to test *only* IBM products. Non-IBM products may give invalid errors or system responses.

Some devices that attach to your system have manuals with test instructions, which you should refer to when testing those devices.

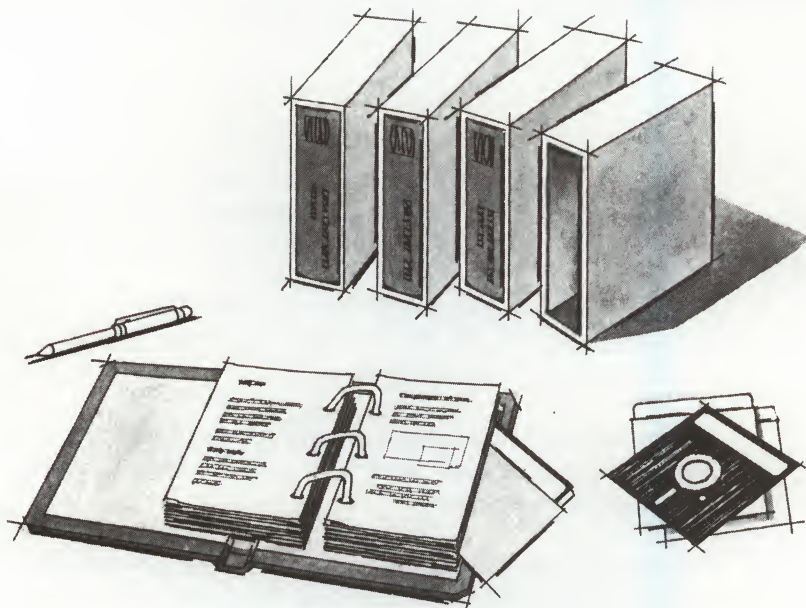
If you are not having problems with your system and just want to verify that it is operating correctly, begin with "System Tests" on page 5-12.

If you decide to return your system for service, remember to bring the power cords and keys. This manual has the information you need for moving your system in Section 3.

Some options that you may add to your system have replacement or additional pages for this section and a Diagnostics diskette. Compare the date of the replacement pages with the date of the pages in this "Testing" section. Keep the pages with the later date. Compare the version number of the Diagnostics diskette with the version number of the Diagnostics diskette in this manual. Keep the diskette with the higher version number.

First, make a note of any symptoms or messages you may have received then continue with the next page.

Software



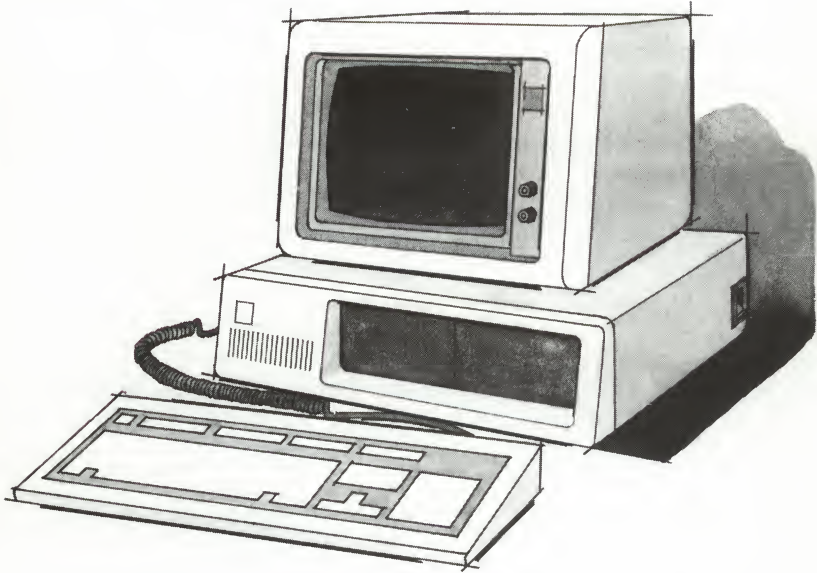
When using software, you may receive error messages. You should refer to the software manual for a description of those messages.

Before you continue, ensure that:

- The software is designed for your system.
- Your system meets the minimum requirements to use the software.
- Your software works on another system.

If the items listed above do not help, continue with “Hardware” on the next page.

Hardware



Before you continue, ensure that:

- The electrical outlet is working.
- All cables and power cords are connected properly.
- Everything is turned on.
- Contrast and Brightness controls are adjusted properly.

If you have just installed an option, ensure that:

- The option is designed for your system.
- The option was installed according to the instructions.

If the items listed above do not help, continue with "Self-Test" on the next page.

Self-Test

Your system performs a self-test each time you turn it on. Follow these steps to observe the self-test.

Pay close attention to the beeps.

- 1 Turn off your system.
- 2 Get the Diagnostics diskette from the back of this manual.
- 3 Load the diskette into drive A.
- 4 Turn on your system.

5

The IBM Personal Computer XT displays memory size in the top left corner of the screen. The number increases until it matches the amount of memory installed in your system.



XXX KB OK

Note: The IBM Personal Computer displays a blinking cursor during self-test instead of memory size.



- Diskette drive light flashes.
- One clear BEEP.

- 6 When the self-test completes, the following screen appears.

**The IBM Personal Computer DIAGNOSTICS
Version XXX (C) Copyright IBM Corp XXXX, XXXX**

SELECT AN OPTION

- 0 - SYSTEM CHECKOUT**
- 1 - FORMAT DISKETTE**
- 2 - COPY DISKETTE**
- 3 - PREPARE SYSTEM FOR MOVING**
- 9 - END DIAGNOSTICS**

**ENTER THE ACTION DESIRED
?**

- 7 **Did your system respond as described?**

YES Go to "System Tests" on page 5-12.

NO Continue with "Self-Test Error Messages" on the next page.

Self-Test Error Messages

Find the message you received and take the action described.

**6XX – Diskette Boot Record Error
or
Diskette Boot Failure**

(X can be any number.)

Action Make sure you are using the Diagnostics diskette and that it is loaded correctly.

Try to start the Diagnostics diskette again. If you still cannot start diagnostics, have the system unit serviced.

1801

XXX KB OK

ERROR. (RESUME = "F1" KEY)

Action Turn off the system unit and the expansion unit for a few seconds.

Turn on the expansion unit.

Turn on the system unit.

If an **1801** error remains, have the expansion unit serviced.

If you did not receive either of the error messages listed above, continue on the next page.

If you received the following message, take the action described.



XX 301

(X can be any number.)

Action Make sure the keyboard is connected correctly and nothing is resting on the keyboard holding a key down. If nothing is holding a key down, try the following:

Turn off the system unit. Wait a few seconds.

Turn on the system unit.

If a **301** error remains, have the system unit, keyboard and keyboard cable serviced.

If you did not receive the error message listed above, continue on the next page.

If you received any of the following messages, take the action described below. If not, go to "Failure Symptoms," page 5-11. (X can be any number.)

1XX
601
17XX
22XX - Cluster Failure
30XX - Network Failure
except 3015* and 3042*
31XX - Network Failure
except 3115* and 3142*
CC000
C8000
FXXXX
Parity Check X
ROM Error
XXXXX
XXXX 20X
XXXXX XX 20X

Action **Do you have an expansion unit attached to the system unit?**

NO Have the system unit serviced.

YES Turn off the system unit and the expansion unit.

Disconnect the expansion unit cable from the system unit.

Turn on the system unit.

Continue on the next page.

*If you receive one of these errors, have the network serviced.

An **1801** occurs when you disconnect the expansion unit. Disregard the **1801** error and continue testing.

Does the same error remain?

NO Have the expansion unit serviced.

YES Have the system unit serviced.

If you did not receive any of the error messages listed, continue with "Failure Symptoms" on the next page.

Failure Symptoms

If your system has any of the following symptoms, take the action described. If your system has more than one of the symptoms, take the action described for the *first* symptom.

Symptoms	Action
No BEEP	Have the system unit serviced.
More than one BEEP	Have the system unit serviced.
None of the keys on the keyboard work	Have the system unit, keyboard and cable serviced.
Only some of the keys on the keyboard work	Have the keyboard and cable serviced.
Totally blank screen	Continue with "Display Problems" on page 5-18.
No cursor displayed	Have the system unit serviced.
Only the cursor is displayed	Have the system unit serviced.
Screen is unreadable	Continue with "Display Problems" on page 5-18.
Missing characters on the screen	Continue with "System Tests" on the next page.
Wrong characters on the screen	Have the system unit serviced.
Incorrect memory size	Have the system unit serviced.
Wrong screen appears	Have the system unit serviced.

If your system does not have any of the symptoms listed above, continue with "System Tests" on the next page.

System Tests

If you have already loaded the Diagnostics diskette, begin with Step 6 on page 5-13.

- 1 Turn off the system unit.
- 2 Get the Diagnostics diskette from the back of this manual.
- 3 Load the diskette into drive A.
- 4 Turn on the system unit.
- 5 If you receive the following message, press the **F1** key and continue.

(RESUME="F1" KEY)

- 6 You will need a blank formatted diskette for each drive installed in your system.
- If you cannot format the diskette, try another diskette. If the second diskette cannot be formatted either, have the system unit serviced.
- 7 Select **1 - FORMAT DISKETTE** and follow the instructions on the screen to format a diskette for **EACH** diskette drive.

**The IBM Personal Computer DIAGNOSTICS
Version XXX (C) Copyright IBM Corp XXXX, XXXX
SELECT AN OPTION
0 - SYSTEM CHECKOUT
1 - FORMAT DISKETTE
2 - COPY DISKETTE
3 - PREPARE SYSTEM FOR MOVING
9 - END DIAGNOSTICS
ENTER THE ACTION DESIRED
?**

- 8 When the screen above reappears, make sure the Diagnostics diskette is in drive A.

9 **Select 0 - SYSTEM CHECKOUT.**

During testing, questions about your installed options may appear. Answer as required.

- 10** A list will appear describing installed devices. If the list is correct, press **Y** then **Enter** (↵) and continue with the next step .

Note: If your printer is missing from the list, press **Y** then **Enter** (↵) and continue with the next step. When you have completed the "System Tests", go to "Printer Problems" page 5-22.

If the list is incorrect, have your system unit serviced.

11 The system will now begin testing itself.

Note any error messages that appear.

During the tests you will be asked to answer questions, test the keyboard, and verify screen characters and images. One of the screens that will appear is shown here so that you can compare it to the Character Set displayed on your system.

CHARACTER SET

[illegible]

- 12** Did the following screen appear indicating your system has finished testing?

SELECT AN OPTION

- 0 – SYSTEM CHECKOUT**
- 1 – FORMAT DISKETTE**
- 2 – COPY DISKETTE**
- 3 – PREPARE SYSTEM FOR MOVING**
- 9 – END DIAGNOSTICS**

**ENTER THE ACTION DESIRED
?**

YES If you noted an error message or still suspect a problem, continue with the next step.

NO Have your system unit serviced.

- 13** Look for your symptom in the following figure. If your system has more than one of the symptoms, take the action described for the symptom that occurred first.

Symptoms	Action
Any 3XX error messages	Have the keyboard and cable serviced.
Error - Expansion Unit XXXX	Have the expansion unit serviced.
Display problems	Continue with "Display Problems" on the next page.
432 error message	Continue with "Printer Problems" on page 5-22.
Any printer errors or problems	Continue with "Printer Problems" on page 5-22.
Tests stop and you cannot continue	Have the system unit serviced.
Any other error messages	Have the system unit serviced.

(X can be any number.)

If you have reached this point and still suspect a problem, you may want to seek technical assistance. A focal person trained to help with specific technical problems, such as communications, may be available at your location or place of purchase.

Display Problems

Make sure that the display or TV controls are adjusted properly.

If you are using a TV, verify that it is working correctly by disconnecting it from the system and operating it normally.

Some displays have their own tests. Check the instructions that came with your display for any self-tests that may have been included.

IBM Monochrome Display

If you are having problems with a monochrome display and received one beep when you turned on the system unit, have the display serviced. If you received any other audio response, have the system unit serviced.

IBM Color Displays

If you are having problems with an IBM color display, continue on the next page.

- 1 Turn on the system unit.
- 2 Turn on the display.
- 3 Turn Brightness and Contrast controls fully clockwise.
- 4 Turn off the system unit.

Did the screen change to white?

YES Go to Step 8 on page 5-20.

NO Continue with the next step.

- 5 Turn off the display.
- 6 Disconnect the display signal cable from the system.
- 7 Turn on the display.

Is the screen white?

YES Have the system unit serviced.

NO Have the display serviced.

8 While watching the screen, turn on the system unit.

Did the screen change from white to black?

YES Continue with the next step.

NO Have the display serviced.

9 If your display has one of the following symptoms, take the action described.

Symptoms	Action
Blank screen	Have the system unit serviced.
Wrong or missing colors	Have the display serviced.

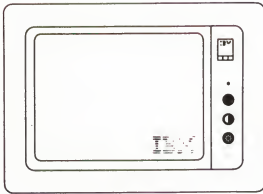
If the symptom is not listed, continue with the next step.

10 Operate the controls listed below.

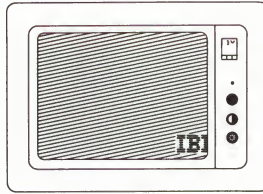
- Brightness
- Contrast
- Vertical Hold
- Vertical Size

If any of the controls listed above do not work, have the display serviced. If all of the controls work, continue with the next step.

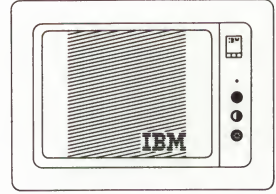
11 Is the problem similar to one of the examples shown below?



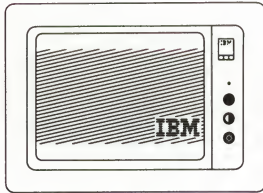
Too Dim



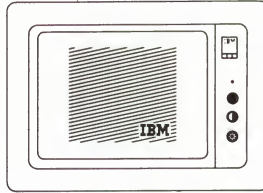
Too Wide



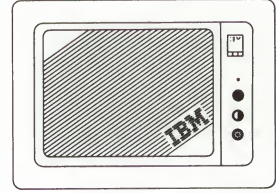
Too Narrow



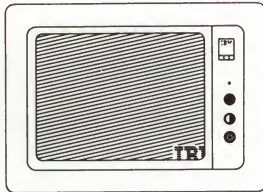
Too Short



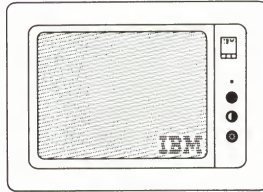
Too Small



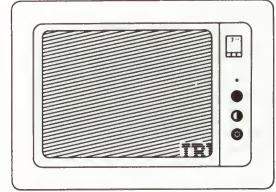
Tilted



**Changes Size When
Brightness Control
Turned**



Out of Focus



**Characters Shifted Left
or Right, or Up and Down
Off the Display Area**

YES Have the display serviced.

NO Have the system unit serviced.

Printer Problems

Refer to the manual that came with your printer and ensure that your printer is:

- Turned on
- Ready (Online).

Printers may have their own tests. Refer to the manual that came with your printer and run the printer tests. If the printer tests work, have the system unit serviced. If the printer tests do not work, have the printer and cable serviced.

Appendix A. KEYBOARD TEMPLATES

Introduction	A-3
French	A-5
German	A-7
Italian	A-9
Spanish	A-11
U.K. English	A-13
U.S. English	A-15

Notes:

Introduction

This section contains layouts for some of the national language keyboards available for use with the IBM Personal Computer. They show keytop characters and key locations supported by a national language keyboard routine (KEYBxx). Additional available characters are listed on the back of each layout. All templates and languages (except U.S. English) are for the 102-key keyboard. If they are used with a U.S. English 101-key keyboard, not all characters will be available. The shaded areas on the keyboard templates are keys that are not available if used on the U.S. English keyboard.

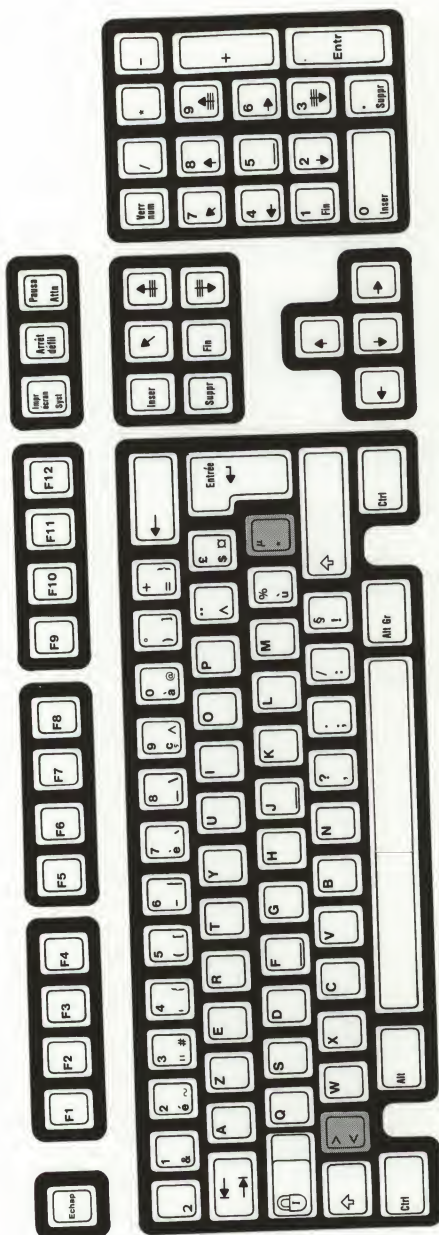
If you do not use DOS, your keyboard converts all keystrokes as if you had a U.S. English keyboard. You should use the U.S. English template as a guide.

Note: To type a character that is on the front face of a keytop, press and hold the right **Alt** key, then press the key with the desired character.

Notes:

French

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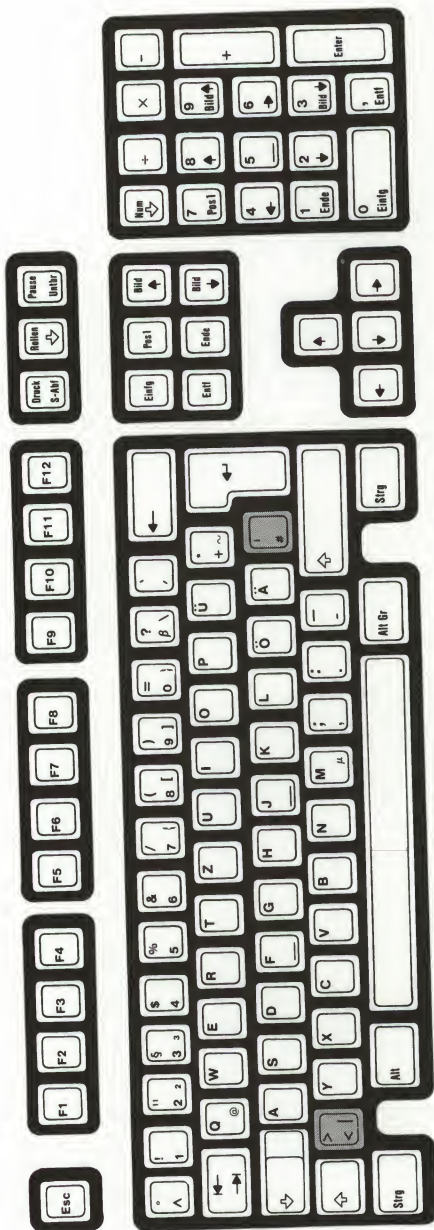
A rectangular box with the word "AIR" written inside, representing the air in the container.

-

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German

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ZUSÄTZLICHE ZEICHEN



1.

Betätigen und halten.

2. Ein 3-Zahlencode auf der Addiermaschinentastatur eingeben.



3.

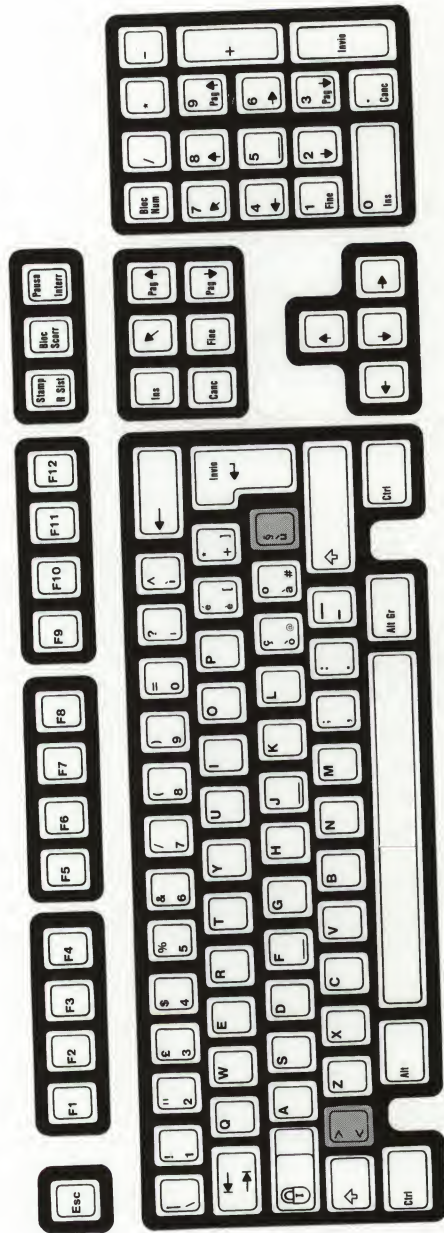
loslassen.

123	!	136	ê	152	ÿ	167	÷	224	œ	234	Ω	243	≤	252	∞
124	!	139	∞	155	€	168	∠	226	∩	235	δ	244	∫	253	²
125	!	140	!	156	£	169	—	227	π	236	∞	245	∫	254	■
126	~	141	!	157	¥	170	—	228	Σ	237	∅	246	÷		
127	□	143	A	158	Pls	171	½	229	σ	238	€	247	≈		
128	Ç	145	α	159	j	172	¼	230	μ	239	∩	248	°		
131	ä	146	€	164	ñ	173	i	231	τ	240	≡	249	•		
134	ä	147	ô	165	N	174	«	232	♣	241	±	250	•		
135	¢	150	ü	166	ä	175	»	233	♠	242	≥	251	√		

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Italian

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CARATTERI AGGIUNTIVI



1. Premere e tenere premuto il tasto

2. Battere un codice di tre cifre sulla tastiera numerica.



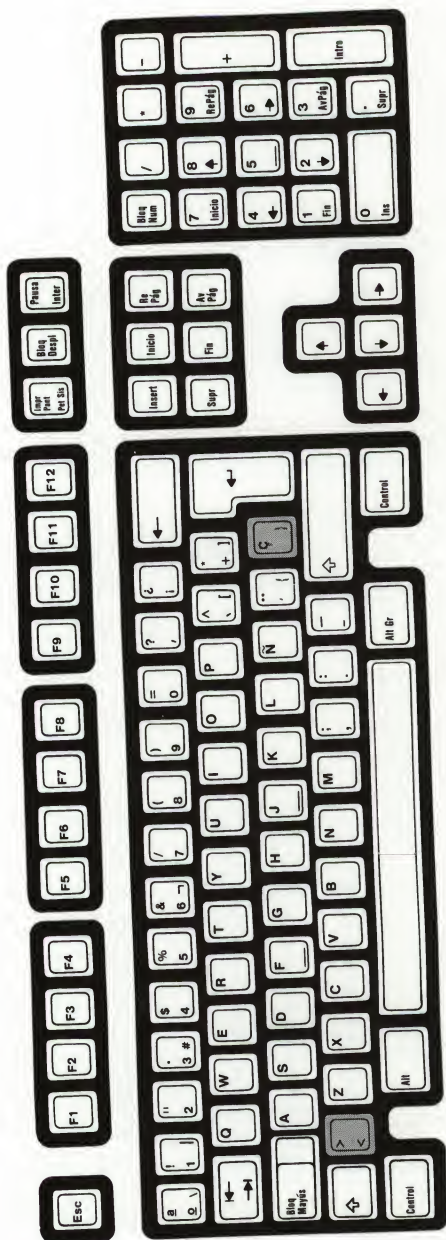
3. Rilasciare il tasto

096	137	148	160	169	226	235	244	253
127	139	150	161	170	227	236	245	254
128	140	152	162	171	228	237	246	255
129	142	153	163	172	229	238	247	
131	143	154	164	173	230	239	248	
132	144	155	165	174	231	240	249	
134	145	157	166	175	232	241	250	
135	146	158	167	176	233	242	251	
136	147	159	168	177	234	243	252	

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Spanish

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CARACTERES ADICIONALES



1. Pulse y mantenga pulsada la tecla

2. Teclee un código de 3 dígitos en el teclado numérico (Lado derecho del teclado)



3. Libere

123	!	156	£	172	¼	230	μ	239	∩	248	°
124	¡	157	¥	174	«	231	τ	240	≡	249	•
125	!	158	Ps	175	»	232	◊	241	±	250	•
126	~	159	f	224	≈	233	⊕	242	≥	251	√
127	◊	166	ä	225	ƒ	234	Ω	243	≤	252	π
134	ä	167	ö	226	┐	235	δ	244	∫	253	z
145	α	169	—	227	π	236	∞	245	∫	254	■
146	£	170	┐	228	Σ	237	∅	246	÷		
155	€	171	½	229	σ	238	€	247	≈		

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ADDITIONAL CHARACTERS



1. Press and hold

2. Type 3-digit code on numeric keypad.



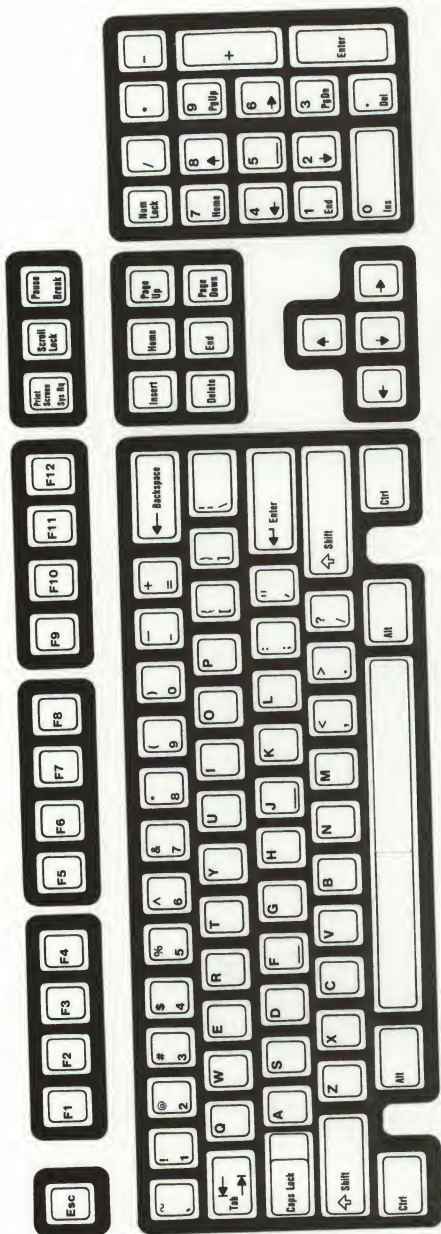
3. Release

096	·	135	ç	144	É	153	ö	163	ü	172	¼	229	σ	238	€	247	≈
127	◊	136	ê	145	α	154	ü	164	ñ	173	í	230	μ	239	∩	248	°
128	Ç	137	ë	146	Æ	155	€	165	Ñ	174	«	231	τ	240	≡	249	•
129	ü	138	è	147	ö	157	£	166	ä	175	»	232	Q	241	±	250	•
130	ë	139	í	148	ö	158	Ps	167	ö	224	←	233	Φ	242	≥	251	√
131	ä	140	í	149	ö	159	í	168	ç	225	ß	234	Ω	243	≤	252	n
132	ä	141	í	150	ü	160	ä	169	ü	226	Γ	235	δ	244	≤	253	z
133	ä	142	Ä	151	ü	161	í	170	í	227	κ	236	∞	245	∫	254	■
134	ä	143	Ä	152	ÿ	162	ö	171	¼	228	Σ	237	Ø	246	÷		

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ADDITIONAL CHARACTERS



1. Press and hold

2. Type 3-digit code on numeric keypad.



3. Release

127	136	145	154	163	172	229	239	248
128	137	146	155	164	173	229	239	248
129	138	147	156	165	174	230	240	249
130	139	148	157	166	175	231	241	250
131	140	149	158	167	224	232	242	251
132	141	150	159	168	225	233	243	252
133	142	151	160	169	226	234	244	253
134	143	152	161	170	227	235	245	254
135	144	153	162	171	228	236	246	255
						237	247	

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Appendix B. SERIAL NUMBERS

Record hardware serial numbers in this section.

System Unit	
Monochrome Display	
Color Display	
Printer	

Notes:

Glossary

This glossary includes terms and definitions from the *IBM Vocabulary for Data Processing, Telecommunications, and Office Systems*, GC20-1699.

adapter. (1) A printed circuit board that plugs into the system board allowing an external option to be attached to the system unit. (2) Any printed circuit board that plugs into the system board.

backup. Duplicating data from a fixed disk drive or diskette to a diskette which ensures availability of data in the event of loss or damage to the original.

BASIC. (1) Beginner's all-purpose symbolic instruction code. (2) A programming language that uses common English words.

computer. A functional unit that can perform substantial computation, including numerous arithmetic operations or logic operations, without human intervention during a run.

computer program. A sequence of instructions suitable for processing by a computer.

configuration. The devices and programs that make up a system, subsystem, or network.

current. The rate at which electrical charges flow.

cursor. (1) In computer graphics, a movable marker that is used to indicate a position on a display. (2) A displayed symbol that acts as a marker to help the user locate a point in text, in a system command, or in storage. (3) A movable spot of light on the screen of a display device, usually indicating where the next character is to be entered, replaced, or deleted.

data. (1) A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by human or automatic means.

device. An electronic piece of equipment with a specific purpose.

Diagnostics diskette. Diskette with programs designed to detect and isolate failing parts of the system.

diskette. A thin, flexible magnetic disk and a semirigid protective jacket, in which the disk is permanently enclosed. Synonymous with flexible disk.

diskette drive. A device for storing data on and retrieving data from a diskette.

display. A device for visual presentation of information on any temporary character imaging device.

DOS. See operating system.

double-sided diskette. A thin, flexible disk treated magnetically to store data on both sides.

external option. Devices attached to the outside of the system unit which extend and enhance its operation. Examples: display, printer or modem.

FCC. Federal Communications Commission.

file. (1) A group of related records as a data file.
(2) To store data as a file, so that it can be retrieved.

fixed disk drive. In the IBM Personal Computer, a unit consisting of nonremovable magnetic disks, and a device for storing data on and retrieving data from the disks.

flexible disk. Synonym for diskette.

format. To prepare a diskette to receive data in an organized fashion.

hardware. (1) Physical equipment used in data processing, as opposed to programs, procedures, rules, and associated documentation. (2) Contrast with software.

internal option. Parts installed inside the system unit covers which enhance operation of the system such as adapters and memory options.

K. 1024 bytes.

KB. 1024 bytes.

load. In programming, to enter data into storage or working registers.

M. 1,048,576 bytes.

MB. 1,048,576 bytes.

memory. Term for main storage.

monitor. Synonym for cathode ray tube display (CRT display).

monochrome display. A display on which data appears in only one color.

operating system. Software that controls the execution of programs; an operating system may provide services such as resource allocation, scheduling, input/output control, and data management.

parity check. (1) A redundancy check that uses a parity bit. (2) Synonymous with odd-even check.

personal computer. A home or business computer that has a processor and keyboard and that can be connected to a television or some other monitor.

program. (1) A series of actions designed to achieve a certain result. (2) A series of instructions telling the computer how to handle a problem or task. (3) To design, write, and test computer programs.

programming language. (1) An artificial language established for expressing computer programs. (2) A set of characters and rules with meanings assigned prior to their use, for writing computer programs.

run. A single continuous performance of a computer program or routine.

setup. The preparation of the system for normal operation.

single-sided diskette. A thin, flexible disk treated magnetically to store data on one side only.

software. (1) Computer programs, procedures, and rules concerned with the operation of a data processing system. (2) Contrast with hardware.

store. (1) To place data into a storage device. (2) To retain data in a storage device.

storage. (1) A storage device. (2) A device, or part of a device, that can retain data. (3) Diskette. (4) Fixed disk drive.

system. A computer configuration including at least a system unit, a keyboard, and a display.

system unit. Main part of the computer configuration.

typematic. Keyboard key that repeats its function when held pressed.

write. To make a permanent or transient recording of data in a storage device or on a data medium.

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